culture solution was present, and that a mixture of the three constituents gave better results than either separately. Maximum results were obtained when 150 parts of the substance per million were present. Evidence is presented to show that the organic compounds are absorbed as such by the plant, and are not decomposed to form ammonia, nitrites or nitrates in the solution.

The development of this new view will be watched with interest, not only by plant physiologists, but by soil students as well.

In another bulletin Messrs. Schreiner and Brown investigate the black soil material insoluble in alkalis, and find lignite particles, coal particles, and other materials, some of which suggests intermediate stages of formation. The coal-like material seemed to be present in every soil, and is considered to be formed during the decomposition of the organic matter. If this turns out to be the case it will add one more to the remarkable reactions going on in the soil.

Messrs. Sullivan and Reid have investigated the power of soils to decompose hydrogen peroxide, and they suggest that this catalytic power is due not to an enzyme, but to the inorganic and organic matter in the soil. The subject is of some interest because it is important to study the conditions under which the reactions go on in the soil.

An entirely different problem is attacked by Prof. A. Wieler in his monograph on the effect on plant growth of removing calcium carbonate from the soil, especially when this removal is brought about by smoke. This is a continuation of the author's earlier work on the effect of sulphur dioxide on plants, which led him to conclude that the injurious result was due not only to an action on the leaf, but to one on the soil. The Claustal (the region investigated by the author) has, like parts of our own Lancashire, lost its trees, and the author concludes that this has come about because the soil has become too depleted of lime for tree growth to be possible. This thesis is developed at considerable length, and a section is added on the injurious effect of metallic salts on plant growth.

NOTES.

THE council of the Royal Geographical Society has made a grant of 1000*l*. towards the expenses of Sir Ernest Shackleton's Transantarctic expedition. Mr. Rudyard Kipling is to lecture before the society on February 17 upon "Some Aspects of Travel."

THE Geological Society of London will this year award its medals and funds as follows:—Wollaston medal, Dr. J. E. Marr, F.R.S.; Murchison medal, W. A. E. Ussher; Lyell medal, C. S. Middlemiss; Wollaston fund, R. B. Newton; Murchison fund, F. N. Haward; Lyell fund, Rev. W. Howchin and J. Postlethwaite.

AN Institution of Petroleum Technologists has been formed, with Sir Boverton Redwood, Bart., as president. Dr. D. T. Day, of the United States Geological Survey, and Prof. C. Engler have been elected honorary members of the institution. Form of application for mebership may be obtained from the secretaries, 17 Gracechurch Street, E.C.

THE council of the Royal Anthropological Institute has made arrangements for an address by Prof. Baldwin Spencer, C.M.G., F.R.S., on the life of the Australian tribesmen, to be given in the theatre of the Civil Service Commission, Burlington Gardens, W., on Tuesday, January 27, at 8 p.m. The address will be illustrated by means of kinematograph films and phonograph records.

ON Tuesday next, January 20, Prof. W. Bateson will deliver the first of a course of six lectures at the Royal Institution on animals and plants under domestication, and on Thursday, January 22, Mr. W. McDougall will begin a course of two lectures on the mind of savage men. The Friday evening discourse on January 23 will be delivered by Sir James Dewar on the coming-of-age of the vacuum flask.

THE volcanic Mount Sakurashima, which forms an island situated at the head of Kagoshima Bay, south of Kiushiu, after being dormant for a century and a quarter, burst into eruption on Monday, destroying the villages on the island and affecting the ancient city of Kagoshima on the mainland a few miles away. It is reported that from Sunday morning to Monday more than two hundred shocks were felt in Kagoshima. When the eruption began, enormous columns of illuminated dust and vapour burst out from the sides of the volcano, and soon enveloped the whole island of Sakurashima. Forty minutes later an eruption began from the summit. The heat from the volcano was intense, and could be felt in Kagoshima. The city of Nagasaki, a hundred miles from Sakurashima, has been covered with a fine deposit of volcanic ash.

THE death is reported, in his eighty-fourth year, of Mr. John Phin, the author of many popular scientific text-books, and a former editor of several New York papers, including *The Manufacturer and Builder*, *The Technologist*, and *The American Journal of Microscopy*. He was born in Melrose, Scotland, and was educated at the parish school, and the Musselburgh Academy, subsequently studying civil engineering in Edinburgh. He went to the United States in 1851, and afterward became professor of chemistry and technology in the People's College, Havana, N.Y., and professor of agriculture in the Pennsylvania Agricultural College. In addition to his scientific interests, he was a devoted Shakespeare student, and compiled a Shakespeare cyclopædia and glossary.

MR. GRIFFITH TAYLOR, in a paper read before the Royal Geographical Society on Monday last, described at length the topographical and geological features of the Australian federal territory, which forms an enclave in New South Wales. It is an area of considerable physiographical interest, and though only of some 900 square miles' area, participates (with the surrounding country) in four well-marked divisions, namely the Lake George plains, an undissected country of recent surface-form, the Murrumbidgee scarp and

Cullarin scarp, with "youthful" features, the Gourock highlands, &c., with their mature valleys and rounded ridges, and the Canberra plains, in a "more mature stage of erosion." Mr. Taylor dealt not only with the geography but briefly with the political considerations which dictated the choice of the site. It fortunately happens that political and geographical considerations coincide, for Mr. Taylor showed how the federal territory is situated on "a line joining the centre of population with the nearest good port," namely Jervis Bay, where the seaport of the new city will be situated. Mr. Taylor described the physical environment of the territory, and incidentally mentioned conditions affecting south-eastern Australia as a whole; he drew an effective comparison between this country and the United States of America, having regard to the points in the history of their settlement and development which each has reached.

DURING the Christmas holidays the Lawes and Gilbert Centenary Fund Committee ceased work so as not to interfere with the ordinary Christmas appeals; it has now begun work again to collect the last 1600*l.* needed to complete the scheme. The object of the centenary fund is to build and equip a satisfactory laboratory for the prosecution of researches in agricultural chemistry, a subject largely founded on the experiments of Lawes, who was born just 100 years ago, and of Gilbert, who was born three years later. These investigators founded the Rothamsted Experimental Station, the oldest, and for many years the best-equipped agricultural experiment station in the world. Rothamsted has maintained its high position in respect of its staff and its field plots, but it has fallen behind in laboratory accommodation, and a serious effort is now being made to remedy this defect. The committee has ascertained that a satisfactory laboratory can be erected and equipped for 12,000*l.*, and it has decided to collect the money, and to put up the laboratory this year in commemoration of the centenary of the birth of the founders. Its efforts have been so far successful that only 1600*l.* is now required; and an urgent appeal is addressed to all interested in agricultural science to aid the committee in closing the list so that the work can be put in hand at an early date. Subscriptions should be sent to the secretary, Rothamsted Experimental Station, Harpendent, Herts.

SIR HERBERT MAXWELL, in a letter to *The Times* of December 10, throws doubt upon a cherished belief of fly-fishermen. Great care is taken by salmon-fishers in the selection of their flies, which are formed by tackle-makers with rare and bright feathers supposed to be particularly attractive to the fish. As a fisherman with more than fifty years' experience of the habits of salmon in many rivers, and as an observant naturalist, Sir Herbert states that he has failed to detect the slightest preference on the part of salmon for one pattern of fly over another. He adds: "I should be perfectly willing, during the few angling seasons which may remain to me, to use no flies except those composed of the feathers of native game birds or barndoor fowls, dyed or undyed, with silk and tinsel to smarten them up to human, if not to piscine, taste." It has been stated that a large number of beautiful birds are sacrificed every year to the demands of fishermen for brilliantly coloured artificial flies. The demand is based upon the assumption that a salmon is capable of discerning details of form and colour in a small object passing between its eye and the high light; although a human eye, in a similar relative position, could perceive nothing but a dark silhouette. According to Sir Herbert's observations, the colour and material of the lures used are of little consequence; and if this be the case, the destruction of numerous brightly plumaged birds in order to provide feathers for artificial flies is not only useless, but also a waste of beauty.

COMMENDATORE BONI has made another notable discovery in the course of his excavations on the Palatine Hill at Rome. He has found the famous *mundus*, or pit, leading to the infernal regions, sacred to Dis and Proserpine. This was covered by the *lapis manalis*, a square, rough-hewn slab of tufa pierced by two round holes. It was the innermost shrine, the most holy centre of the Roman religion, consecrated to the ancient mysteries, whence germinated and spread forth the fundamental energies of the Roman people. The later Romans had lost the site of this sacred spot, and the Emperor Augustus, in his desire to re-establish the ancient usages, searched for it in vain. A shaft, filled with débris, discovered in the course of recent digging, may well represent the exploration by Augustus.

A JOURNAL dealing with Egyptian antiquities has long been needed. We are glad to welcome the appearance of a new quarterly magazine, having the title, *Ancient Egypt*, which, under the editorship of Prof. Flinders Petrie, promises to supply the want. The first issue is well printed and illustrated, contains much interesting matter, and is procurable at the modest cost of 7*s.* per annum. Prof. Petrie notices an interesting fact about early glass manufacture. Sir Gardner Wilkinson ("Manners and Customs," ed. 1878, Fig. 380) published a drawing supposed to represent men blowing glass bulbs on the end of rods. But though examples of early glass, especially about 1500–1400 B.C., are abundant, not a single piece of blown glass can be dated before Roman times. The men are really using reed blowpipes for a jeweller's furnace, and as these blowpipes would soon be burnt at the end, a lump of mud was put on as a nozzle to the pipe. The new journal is published by Messrs. Macmillan and Co., Ltd.

IT will be remembered that the eighteenth International Congress of Americanists was held in London during May, 1912. Two articles appeared in NATURE dealing with the congress; one on April 18, 1912 (vol. lxxxix., p. 169), gave the outstanding items of the programme, and the other on June 6, 1912 (vol. lxxix., p. 379), summarised the proceedings. The editorial committee has now issued in two volumes running to 570 quarto pages (London: Harrison and Sons, 2*l.* 2*s.* net) the full proceedings of the session. Full lists are included of the names of the officers, organising committee, delegates, members, and associates. The presidential address of Sir Clements Markham and the papers read in the various sections are given in full, and many of the latter are handsomely and profusely illustrated. The success of the congress must be very gratifying to Sir Clements Markham, Dr. A. C. Haddon, and Mr. A. P. Maudslay, to whom the organisation and arrangements were entrusted.

IN the number of *Biometrika* issued in October, 1913, Dr. H. S. Stannus describes cases of albinism or deficiency of pigment in natives of Nyasaland. He classifies them into several groups, ranging from complete albinism to a condition in which the skin is light brown, the hair yellow, and the irides hazel, and also separates off three distinct groups of piebalds and "spotlings." He also describes cases of pathological leucoderma, and discusses its relation with albinism. The descriptions indicate that there is considerable grading between the different classes; the examples classed as complete albinos have some pigment in the fundus and iris, and there seems to be no sharp line of distinction between these and cases with pigment in the skin. The more extreme cases are often associated with bad teeth. The short pedigrees given show no instance of direct transmission from parent to child, but several of more than one case in a family.

IN *The Field* of December 13, 1913, Mr. Lydekker adduces evidence to show that the Circassian goat may be a domesticated derivative from the markhor (*Capra falconeri*), which it resembles in the direction of its horn-spirals, and thereby differs from other domesticated goats—the offspring of the wild *C. hircus aegagrus*.

IN the Proceedings of the U.S. National Museum, vol. xlv., pp. 651–57, Dr. F. W. True describes a new species of beaked whale from the Californian coast, under the name of *Mesoplodon mirum*, a preliminary diagnosis having been given in an earlier note. The species is related to Sowerby's beaked whale (*M. bidens*), and also to *M. europaeus*, from the latter of which it differed by the form of the beak and of certain other elements of the skull.

THE new generic and specific name, *Leurospondylus ultimus* is proposed by Mr. Barnum Brown (Bull. Amer. Mus. Nat. Hist., vol. xxxii., pp. 605–15) for a plesiosaurian from the Upper Cretaceous Edmonton beds of Alberta, Canada, which is of special interest on account of being the latest member of its order at present known. It was a relatively small species, the vertebral column measuring about 7 ft., and related to Elasmosaurus, among its distinctive features being the medium length of the neck, the shortness and width of the centre of the vertebræ, and the single-headed ribs.

IN an article on the inheritance of left-handedness in the *American Naturalist* for December, 1913, Prof. F. Ramaley points out that the peculiarity, in its true form (*i.e.* when not acquired), seems to be connected with an unusually high development of the right cerebral hemisphere. As the result of the record of 1740 cases, of which 610 were parents, it is concluded that as regards inheritance, left-handedness is a Mendelian recessive. Out of 305 families there were only two in which both parents were left-handed, and in one of these one of the three children was right-handed, whereas if the inheritance were recessive all should have been left-handed. A possible explanation of the anomaly is that one of the parents was naturally right-handed.

To the large number of extinct bisons from the superficial formations of North America already described as distinct species, Dr. O. P. Hay, in a paper published in the Proceedings of the U.S. National Museum, vol. xlvi, pp. 161–200, adds a new one, under the name of *Bison regius*. It is typified by a skull discovered in 1902 near Hoxie, Sheridan County, Kansas, and appears to be nearly related to *B. latifrons*, of Ohio, from which it differs by the greater length, slenderness, and curvature of the horns, and also by the folding of the enamel of the central pits in the crowns of the upper molars. The latter feature is the one on which the author chiefly relies in distinguishing the new species from *B. latifrons*, as the difference in the horn-cores might be merely sexual. The paper, which is illustrated by eleven plates, also contains a synopsis of all the other species, with a "key" to their distinctive features. In a second paper the same author (*op. cit.*, pp. 267–77) recognises seven species of the North American Pleistocene genus Camelops, and at the same time discusses the characters distinguishing this genus from the existing Lama (Auchenia), with which it has been regarded by some writers as identical. Among the more important differences are the absence of a vertical ridge at the antero-external angles of the last two lower molars of Camelops, the longer and narrower skull, the more elongated grinding surfaces of the upper molars, the more procumbent lower incisors, and the narrower upper portion of the nasal bones of the skull.

WE have received a reprint of a paper from *The Salmon and Trout Magazine*, July, 1913, by Mr. J. Arthur Hutton, on Wye salmon (results of scale reading, 1908 to 1912), in which the author gives numerous statistics of the length, girth, weight, &c., of a considerable number of salmon caught each year, together with some information as to age and spawning, as shown by examination of the scales of the fish. Work of this character is most valuable from the point of view of the study of the life-history of the fish, and it would lead to a considerable increase of our scientific knowledge of the salmon if fishermen would make similar observations on the fish of other British rivers. One of the most interesting results brought out by Mr. Hutton's figures is that the proportion of girth to length of Wye salmon, which may be regarded as a measure of the condition of the fish, is highest (0·523) in fish netted at the mouth of the river, whilst it gradually decreases in fish taken in the higher waters, until it sinks to 0·497 in those salmon caught above Builth, which is 115 miles from the sea.

MISS DORIS MACKINNON contributes to the *Quarterly Journal of Microscopical Science* (vol. lix., part 3) some interesting notes on certain flagellate Protozoa found in the intestine of the common leather-jacket, or larval crane-fly. It appears that no fewer than eight kinds of flagellates and two amœbæ are found in this situation, feeding upon a rich bacterial flora. The author suggests that the term "parasite" is scarcely applicable to such organisms, which appear to fulfil a useful function in keeping down the bacteria, and points out that the richest intestinal fauna was generally found in the largest and healthiest looking grubs. She believes that totally different species of animals, when they frequent the same feeding grounds, may serve as hosts to the same species of protozoan parasites. The beautiful form known as *Rhizomastix gracilis* was described by Alexeieff in 1912 from the Axolotl, and Miss Mackinnon now records and figures it from the crane-fly larva, filling in certain particulars as to its life-cycle. A new subgenus and species, *Tetratrichomastix parisii,* is proposed for another flagellate from the same host, the subgeneric name being chosen on analogy with Tetratrichomonas. It is true that Tetratrichomonas possesses an undulating membrane which may represent a fifth flagellum, but the fact that five separate flagella are actually present in the new subgenus makes the proposed name distinctly misleading.

THE rust-fungi (Uredineæ) of Nova Scotia are dealt with in detail by W. P. Fraser in vol. xii., part 4, of the Proceedings of the Nova Scotian Institute of Science. The author gives an excellent introductory account of the structure and life-history of the group, followed by detailed descriptions of the ninety-two species known from Nova Scotia, including several not hitherto found in any other part of North America. In the descriptions the terminology proposed by Arthur in his well-known work on North American Uredineæ is followed, though it is doubtful whether botanists in general will perceive any special advantage in the new terms adopted for the various pore-forms in place of those which have become familiar by long usage.

A VALUABLE contribution to our knowledge of soil gases and the complex conditions surrounding the growth of crops in swamp rice soils has been made in the Memoirs of the Department of Agriculture in India, vol. iii., No. 3, chemical series, by Mr. W. H. Harrison and Subramania Aiyer. The results obtained show that the normal fermentation of green manure in swamp paddy soils leads to the production of a relatively large quantity of methane, a smaller amount of nitrogen, together with some carbon dioxide and hydrogen. This in itself is not surprising when one considers the anaerobic conditions obtaining in the flooded soil, but it has been further observed that the introduction of a crop greatly modifies the composition of the soil gases, either by directly retarding the rate of fermentation and restricting the formation of methane and hydrogen, or by a portion of the intermediate products of decomposition being removed out of action by absorption by the roots. The latter has been experimentally demonstrated in various recent investigations, and the nutrition of paddy rice would appear to consist in the assimilation of nitrogen either in the form of ammonia or of organic compounds produced by the decomposition of the proteids of the green manure, since nitrification is impossible under the anaerobic conditions that obtain in these soils.

THOSE who desire to keep pace with modern views on crust-displacements and mountain-structure, whether as an aid to geographical or geological studies, will find a well-illustrated summary in Otto Wilckens's "Grundzüge der tektonischen Geologie" (Jena: G. Fischer; price 3.50 marks), which covers matters that are not to be found in every text-book.

THE Government Printing Office at Kingston, Jamaica, has issued a coloured geological map of Jamaica, which may be found generally useful, on the scale of one inch to twenty miles. It is published separately as Publication No. 420, with an explanation by Maxwell Hall, but might be overlooked by geologists, since it officially forms part of the memoir on "The Rainfall of Jamaica from about 1870 to end of 1909."

THE Cotteswold Naturalists' Field Club maintains its reputation for original publication in its eighteenth volume (1913). L. Richardson and C. Upton describe new species of brachiopods from the Inferior Oolite, and the former author, with E. T. Paris, publishes a supplement to previous work on the echinoids from the same formation. The photographs of important species are in both cases admirable. The country where William Smith found such welcoming friends as Benjamin Richardson and Joseph Townsend will never forget the principles of stratigraphical geology.

"A BIBLIOGRAPHY of Russian Ethnographical Literature" forms vol. xl., No. 1, of the *Zapiski* of the ethnographical section of the Russian Geographical Society. It covers the years 1700 to 1910, and is compiled by M. D. K. Zelenin on behalf of the Commission for the Construction of an Ethnographical Map of Russia.

PROF. KUZNETSOF, whose historical sketch of the flora of Daghestan has already been referred to in these pages (vol. lxxxviii., p. 600), gives an account of his investigations and results in the *Izvestiya* of the Russian Geographical Society, Nos. i.–iii., 1913. At the end of the number is a map showing the distribution of the most distinctive forms, and a full list compiled by M. P. P. Popof, of the plants collected.

THE narrative of M. Zhitkof, who explored the Yamal Peninsula, in 1908, is published in the *Zapiski* of the Russian Geographical Society, vol. xlix. The name Yamal, meaning "end of the earth," in the Samoyed language, is more correct than the usual Yalmal, which signifies "mouth of the river" (Ob). The country is low, especially in the north, where it slopes down to the Malygin strait, and the watershed is there inconspicuous. In the south it is more marked, rising at the Yarro-to lakes to 300 ft. above sea-level. The eastern and western coasts often rise in steep cliffs of clay and sand. Lakes and basins partially filled up are numerous in the central part. The work includes chapters on the fauna and flora, the Samoyeds and reindeer grazing. M. Rudovits contributes a report on the meteorological observa tions, and General Shokalski on the hypsometrical determinations. The volume contains numerous illustrations, a map of the peninsula, and one of the lakes Noi-to and Yambu-to, from a survey by Captain Vvedenski.

In the last annual report of the Meteorological Committee it was stated that, at the request of H.M. Treasury, the committee had entered into negotiations with the Scottish Meteorological Society with the object of placing the finances of the latter upon a satisfactory footing as regards the supply of information to the public generally, and of securing a closer cooperation with the Meteorological Office in respect of climatological stations in Scotland. The Journal of the society (vol. xvi.), and the last report of the council to the general meeting of the society, show that the financial position of the latter had long caused great anxiety, the only additions to its ordinary income (derived chiefly from decreasing voluntary sources), being small annual payments for observations by the Registrar-General (Scotland) and the Meteorological Committee. A strongly supported appeal to the Treasury ultimately resulted in the action above referred to, and we are glad to find that the deliberations between the various authorities interested have been crowned with success. The amount hitherto paid by the Meteorological Committee is very materially increased (from April 1, 1913), and that paid by the Registrar-General will be continued. A Meteorological Office has been established in Edinburgh, the organisation of the supply of information on the lines above-mentioned has been secured, and the arrangements are considered to be "in the best interests of meteorology and of the society." The public funds will be administered by a representative committee (including several members of the society), with Dr. W. N. Shaw as chairman.

A careful examination of the effects of temperature on the physical properties of a number of minerals has been undertaken by the geophysical laboratory of the Bureau of Standards. The first communication dealing with the results obtained, appears in the Journal of the Washington Academy of Sciences for December 4, and is devoted to the measurements of the change in the crystal angles of quartz made by Mr. F. E. Wright at temperatures between 0° C. and 1250° C., with a special two-circle goniometer constructed for the laboratory. The author finds that the polar angle for the unit rhombohedron (1011) decreases from 51° 47·5′ at 0° C. to 51° 37′ at 575° C., the quartz then changes from the α to the β form, and the angle becomes 51° 35′ and remains constant up to 1250° C. The agreement between these observations and those of Randall on the expansion of quartz, those of Sosman on its specific volume, and the tabulated values of its birefringence is very close over the range 0° C. to 550° C.

We have received copies of Nos. 5 and 6 of the *Publications de la Société de Chimie-Physique,* issued by the Librairie Scientifique A. Hermann et Fils, Paris. No. 5 is entitled "L'Etude physico-chimique des sels chromiques," by M. A. Sénéchal (pp. 28, price 2 francs), and No. 6 "L'additivité des propriétés diamagnetiques et son utilisation dans la recherche des constitutions," by M. Paul Pascal (pp. 26, price 1 franc). These form part of the useful series of monographs issued by the society, and were originally delivered as lectures before the members.

In the *Sitzungsberichte* of the Imperial Academy of Sciences, Vienna (vol. cxxii., class ii. b, p. 75), Messrs. V. Rothmund and A. Burgstaller describe a method for the estimation of ozone and hydrogen peroxide in presence of each other, for which purpose no accurate method is yet known. Advantage is taken of the fact that, by the addition of a trace of molybdic acid, it becomes possible accurately to determine hydrogen peroxide iodometrically. Difficulties are encountered in estimating ozone directly in a similar manner, but by adding potassium bromide under certain defined conditions, and subsequently potassium iodide, iodine is liberated quantitatively, and the two methods can be combined so as accurately to estimate both substances.

The presidential address delivered to the American Chemical Society at Rochester, N.Y., by Mr. A. D. Little, is reprinted in *Science* (vol. xxxviii., No. 984), under the title, "Industrial Research in America." Mr. Little points out that although Germany has long been regarded as pre-eminently the country of organised research, a new competitor is arising in the United States, "that prodigal among nations, still justly stigmatised as the most wasteful, careless, and improvident of them all." Within the last few years enormous funds have been allotted to the organisation of research in a large number of the principal industrial concerns of the United States, and a very striking account is given of some of the most important achievements of this new system. "Research has firmly established itself among the foundation-stones of our industrial system, and the question is no longer 'What will become of the chemists?' It is now, 'What will become of the manufacturers without them?'" There are in the United States at least fifty notable laboratories engaged in industrial research for private companies, in several of which the expenditure is more than 300,000 dollars a year. An interesting summary is given of the activities of Government departments, such as the Department of Agriculture, the Bureau of Mines, and the Bureau of Standards of the Department of Commerce, which alone devotes about 700,000 dollars annually to scientific work.

The Engineer for January 9 has an illustrated article on the motor ship *Fionia,* the largest and highest powered ship of this kind in service. This vessel is the ninth motor ship built by Messrs. Burmeister and Wain, of Copenhagen, and is 395 ft. long, with a dead-weight capacity of 7000 tons. She is propelled by two sets of Diesel engines, having a combined horse-power of 4000. Each set has six cylinders as compared with eight in earlier ships, and the cylinder sizes have been increased from 530 mm. diameter and 730 mm. stroke to 740 mm. diameter and 1100 mm. stroke. The speed has been reduced from 135 to 100 revolutions per minute. The *Fionia* ran her official trials in Copenhagen Sound on December 18 with uniformly favourable results.

AN article in *Engineering* for January 9 directs attention to the waning supply of petroleum. Although a continually greater supply of petroleum is being placed on the market, this increased output is secured only by sinking more wells and boring to a greater depth, showing that the surface supply is becoming exhausted. At the beginning of this century the wells touched 1100 ft., and to-day the average level of the oil may be placed at 2000 ft.—an ominously rapid rate of sinking. Dissatisfaction with existing methods and acute appreciation of the necessity for increased effort to keep up the yield have induced the United States Bureau of Mines to issue a warning, and to suggest improved methods of working. It cannot but be regarded as a happy augury that the authorities are alive to the extent of the drain made on the stores of oil, and of the necessity of husbanding the resources of the future. America, by reckless expenditure of her resources, has increased her annual output to 200 million barrels, yet the demand for oil for special purposes has become so great that the rise in price is considerable—so great, indeed, that competition with coal for ordinary purposes has become impossible. The entire production of petroleum from all sources is only about one-fifth of the coal produced in England alone, and already schemes are on foot for obtaining a motor fuel from other sources.

THE issue of "Willing's Press Guide" for 1914 is the forty-first to appear. The first 297 pages are devoted to an alphabetical list of newspapers and periodicals. Among other useful contents may be mentioned the classified list of the periodical Press of the United Kingdom according to the interest or subject dealt with, and the lists of metropolitan newspapers, the provincial Press, and American newspapers.

OUR ASTRONOMICAL COLUMN.

COMET 1913*f* (DELAVAN).—This comet is gradually creeping up in north declination and getting brighter. The following is an ephemeris for intervals of four days:—

Berlin Midnight.

	R.A. h. m. s.	Dec. ° ′
Jan. 12	2 53 25	−2 1
16	2 54 58	−0 36
20	2 57 30	+0 59
24	3 1 3	+2 43
28	3 5 40	+4 36

THE CROSSLEY REFLECTOR AND NEBULÆ.—Mr. Heber D. Curtis contributes to the Lick Observatory Bulletin, No. 248, a second list of nebulæ and clusters photographed with the Crossley reflector, being a continuation of that which appeared in Bulletin No. 219. It comprises photographs secured between September 26, 1912, and November 1, 1913. The exposures were practically all of two hours' duration, but the author states that longer exposures and counts limited to a radius of 15′ from the optical axis might easily show larger number of nebulæ per square degree. The present list comprises descriptions of 109 nebulæ and clusters, and many uncatalogued nebulæ which present features of interest are included. The list is striking in that on some plates such a large number of nebulæ was photographed. Thus under N.G.C. 20 it is stated that there are forty-one nebulæ on this plate; under N.G.C. 68 eighty-seven were counted in an area of 45′ × 55′; on other plates we find 30, 31, 37, 31, 36, 28, 47, 69, 28, 17, nebulæ recorded.

GALACTIC COORDINATES.—The *South African Journal of Science* for November last (vol. x., No. 3) contains a communication from Mr. R. T. A. Innes, advocating the use of galactic coordinates for star positions. The adoption of fixed instead of moving coordinates is an object much to be desired, and it would eliminate a great amount of labour if such a system could be adopted. Regarding the adoption of the galactic plane as a point of departure for measurement the galaxy is so irregular that estimates of the great circle which most truly represents it do not agree among themselves. Mr. Innes thinks, however, that such criticism is superficial. Mr. Crommelin (*Knowledge*, January) points out that both the galactic circle and the suggested starting point, the longitude of the sun's apex, are arbitrary, and that "it would be exceedingly difficult to get the astronomers of all nations to agree on points of this kind." Further, he suggests that it is likely that for a long time to come meridian instruments will be the chief means of obtaining the places of at least the brighter stars, so that the R.A.'s and declinations will still have to be found. Mr. Innes's paper is nevertheless an interesting and suggestive contribution.

THE ARC SPECTRUM OF IRON.—Lick Observatory Bulletin, No. 247, is devoted to an investigation on the arc spectrum of iron carried out by Mr. Keivin Burns at the Physical Institute at Bonn at the suggestion of Prof. Kayser. The object was to measure with reasonable accuracy all the lines of the arc spectrum of iron which can be readily photographed. It was proposed to measure the stronger lines on four plates each and the fainter on two plates. This programme has been completed for the region 3206–7800 A, but for various reasons shorter and longer wave-lengths than the above are excluded. The apparatus used was a Rowland concave grating mounted according to Abney's method—that is, the slit is the only movable part of the apparatus. The author describes the plates used, the standards employed, and the method of measurement and reduction, and accompanies his communications with the long list of wave-lengths derived. In comparing his results with those of Goos, he finds that the differences, Burns minus Goos, are usually less than 0·004 A, limiting the comparison to lines about equal in intensity to the standards. Other lines, he says, do not agree so well. Referring to the Mount Wilson measures, he writes:—"My measures are in good agreement with the values of St. John and Ware, in the case of lines for which these observers find the same wave-length on Mount Wilson as in Pasadena. In cases where they find a difference between the mountain- and sea-level, my measures are in excellent agreement with the wave-lengths found on the mountain, although my observations were made at sea-level." The author again directs attention to the systematic differences of wave-lengths or displacements with regard to the lines of impurities, a subject referred to in this column on August 7 of last year (vol xci., p. 592). He here asks the question: "Will the wave-length of a line in the carbon arc be different from the wave-length of the same line at the same pressure in the iron arc?" The answer may not be so easy to give correctly as it appears to be.